

**I Claim:**

1. A network element coupled to a plurality of optical transmission paths via respective interfaces, wherein each optical transmission path carries a wavelength division multiplexed (WDM) signal having a plurality of optical channels, the network element comprising:

5 at each interface, an add/drop routing element for receiving a WDM input signal, for selectively dropping individual optical channels from the WDM input signal at the network element, for selectively adding individual optical channels for transmission in a WDM output signal, and for selectively routing individual optical channels from the WDM input signal to any other interface  
10 for transmission in any of the plurality of optical transmission paths.

2. The network element according to claim 1, wherein the add/drop routing element includes:

15 an optical distributor portion adapted for receiving the WDM input signal, for dropping selected optical channels from the WDM input signal, and for selectively routing remaining optical channels to one of the other interfaces; and

20 an optical combiner portion adapted for adding individual optical channels to the WDM output signal and further adapted for receiving and combining optical channels supplied from one or more other add/drop routing elements associated with other interfaces with the individual optical channels being added to generate the WDM output signal.

3. The network element according to claim 2, wherein individual  
25 optical channels are capable of being selectively routed among any of the plurality of optical transmission paths via the respective interfaces.

4. The network element according to claim 2, wherein the optical distributor portion includes an optical demultiplexer operable to separate  
30 individual optical channels in the WDM input signal so that selected optical channels can be dropped from the WDM input signal and so that individual

optical channels not being dropped can be routed to one or more interfaces associated with each of the other plurality of optical transmission paths.

5. The network element according to claim 2, wherein the optical  
5 combiner portion includes:

an optical multiplexer operable to selectively add individual optical channels at a respective interface; and  
an optical combiner for combining the optical channels being added at the respective interface with optical channels supplied from the one or more  
10 other add/drop routing elements associated with the other interfaces.

6. A method of selectively routing individual optical channels of a wavelength division multiplexed (WDM) signal at a node having a plurality of optical interfaces each coupled to a respective optical transmission path, the  
15 method comprising:

receiving a WDM input signal at a first optical interface;  
selectively dropping individual optical channels from the WDM input signal at the first optical interface;  
selectively routing individual optical channels not being dropped at the  
20 first optical interface to one or more of the other of the plurality of optical interfaces via a respective intra-node optical transmission path; and  
combining individual optical channels being added to the WDM input signal at the first optical interface with optical channels received from the other of the plurality of optical interfaces via the respective intra-node optical  
25 transmission paths for transmission as a WDM output signal from the node,  
wherein individual optical channels are capable of being selectively routed among the plurality of optical transmission paths via the plurality of optical interfaces.

30 7. A node having a mesh topology for selectively routing individual optical channels of a wavelength division multiplexed (WDM) optical signal, wherein the node is coupled to a plurality of optical transmission paths via respective interfaces, the node comprising:

a plurality of add/drop routing elements each coupled to one of the plurality optical transmission paths,

wherein each of the plurality of add/drop routing elements includes

an input for receiving a WDM input signal,

5 an optical router for dropping selected optical channels from the WDM input signal and for selectively routing optical channels not being dropped via one or more intra-node transmission paths to one or more other add/drop elements in the node,

10 an optical combiner coupled to each of the one or more intra-node transmission paths for receiving and combining optical channels being added at the node with optical channels supplied from the one or more other add/drop elements in the node, and

15 an output for generating a WDM output signal comprising optical channels supplied from any of the plurality of add/drop elements and optical channels being added at the node.